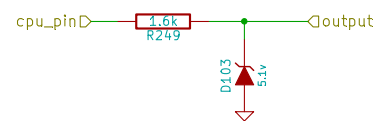
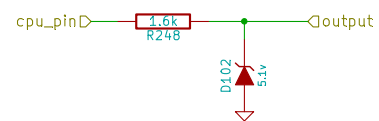


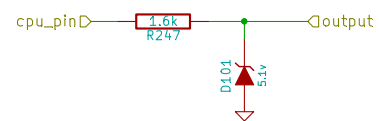
diyefi.org		
File: digi_protect.sch		
Sheet: /digi_protect_PT7/		
Title: Puma board		
Size: A4	Date: 27 dec 2010	Rev:
KiCad E.D.A.	eeschema (20100406 SVN-R2508)-final	Id: 2/56



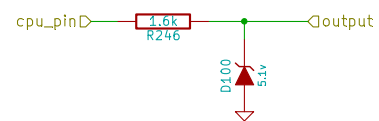
diyefi.org		
File: digi_protect.sch		
Sheet: /digi_protect_PT6/		
Title: Puma board		
Size: A4	Date: 27 dec 2010	Rev:
KiCad E.D.A.	eeschema (20100406 SVN-R2508)-final	Id: 3/56



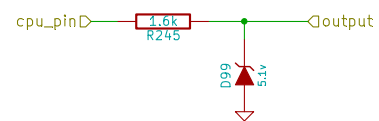
diyefi.org		
File: digi_protect.sch		
Sheet: /digi_protect_PM3/		
Title: Puma board		
Size: A4	Date: 27 dec 2010	Rev:
KiCad E.D.A. eeschema (20100406 SVN-R2508)-final		Id: 4/56



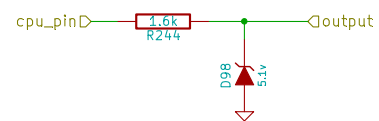
diyefi.org		
File: digi_protect.sch		
Sheet: /digi_protect_PM2/		
Title: Puma board		
Size: A4	Date: 27 dec 2010	Rev:
KiCad E.D.A. eeschema (20100406 SVN-R2508)-final		Id: 5/56



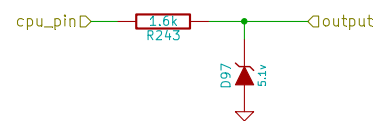
diyefi.org		
File: digi_protect.sch		
Sheet: /digi_protect_PM1/		
Title: Puma board		
Size: A4	Date: 27 dec 2010	Rev:
KiCad E.D.A. eeschema (20100406 SVN-R2508)-final		Id: 6/56



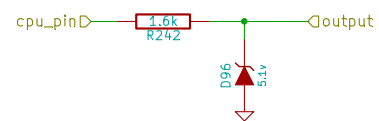
diyefi.org		
File: digi_protect.sch		
Sheet: /digi_protect_PM0/		
Title: Puma board		
Size: A4	Date: 27 dec 2010	Rev:
KiCad E.D.A.	eeschema (20100406 SVN-R2508)-final	Id: 7/56



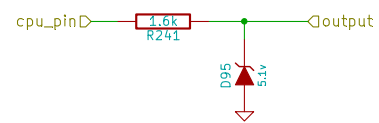
diyefi.org		
File: digi_protect.sch		
Sheet: /digi_protect_PP6/		
Title: Puma board		
Size: A4	Date: 27 dec 2010	Rev:
KiCad E.D.A.	eeschema (20100406 SVN-R2508)-final	Id: 8/56



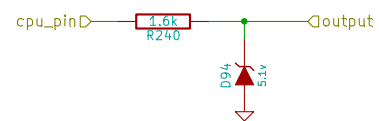
diyefi.org		
File: digi_protect.sch		
Sheet: /digi_protect_PP7/		
Title: Puma board		
Size: A4	Date: 27 dec 2010	Rev:
KiCad E.D.A.	eeschema (20100406 SVN-R2508)-final	Id: 9/56



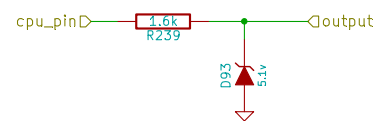
diyefi.org		
File: digi_protect.sch		
Sheet: /digi_protect_PJ2/		
Title: Puma board		
Size: A4	Date: 27 dec 2010	Rev:
KiCad E.D.A.	eeschema (20100406 SVN-R2508)-final	Id: 10/56



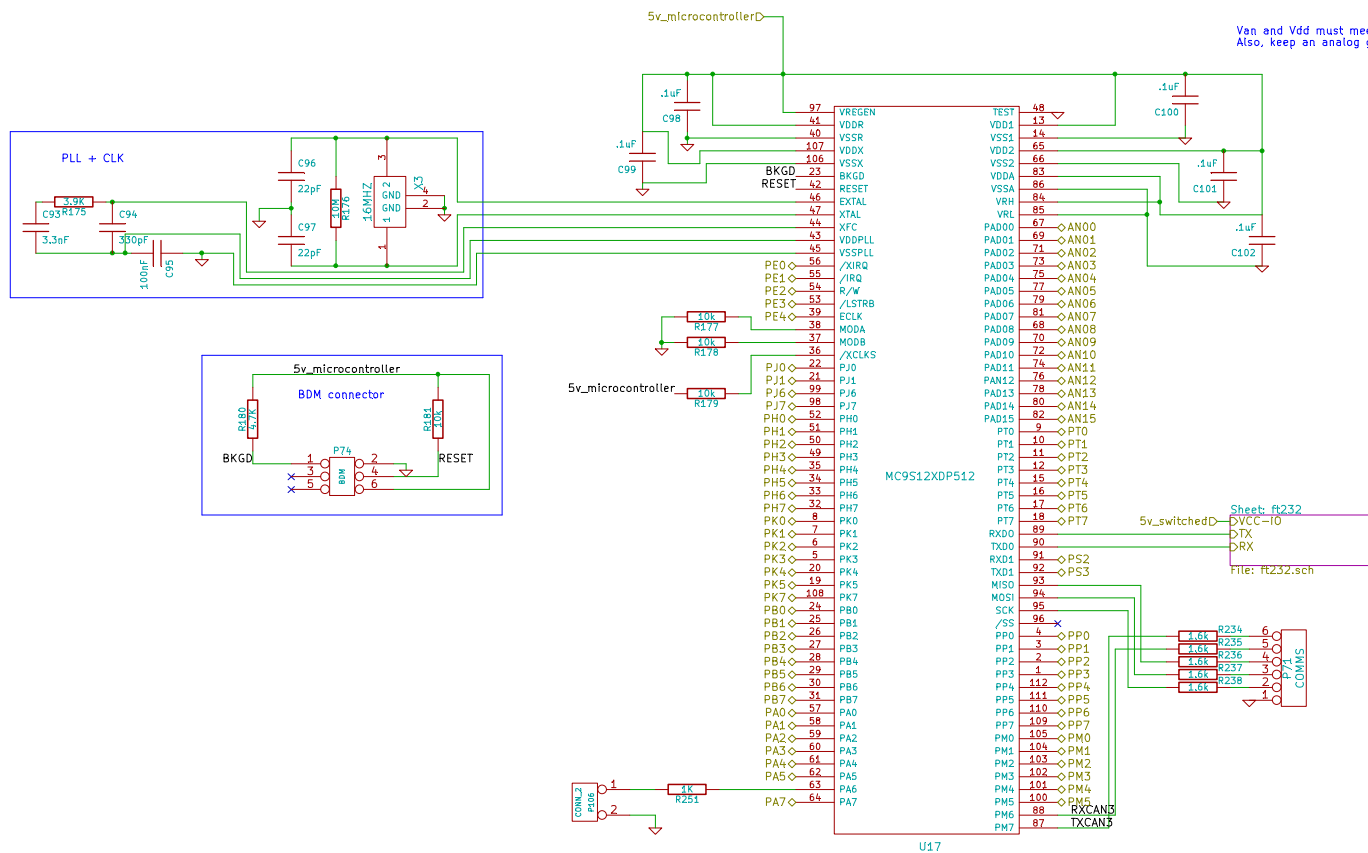
diyefi.org		
File: digi_protect.sch		
Sheet: /digi_protect_PJ3/		
Title: Puma board		
Size: A4	Date: 27 dec 2010	Rev:
KiCad E.D.A.	eeschema (20100406 SVN-R2508)-final	Id: 11/56

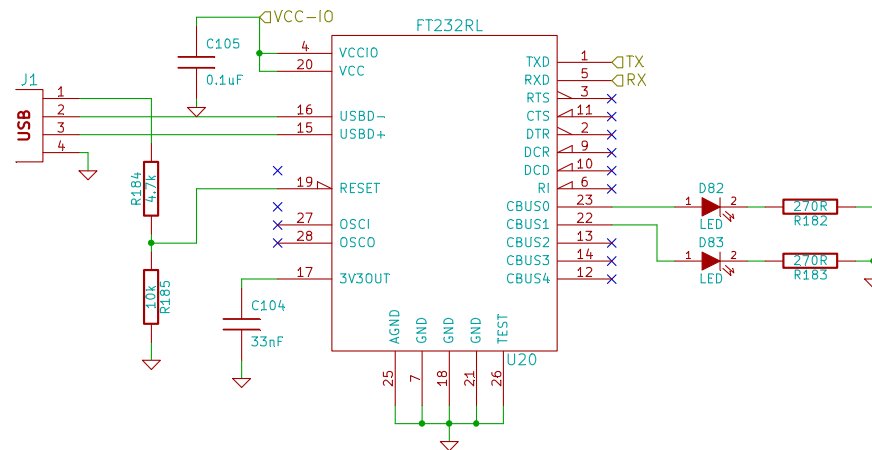


diyefi.org		
File: digi_protect.sch		
Sheet: /digi_protect_PJ1/		
Title: Puma board		
Size: A4	Date: 27 dec 2010	Rev:
KiCad E.D.A.	eeschema (20100406 SVN-R2508)-final	Id: 12/56



diyefi.org		
File: digi_protect.sch		
Sheet: /digi_protect_PJ0/		
Title: Puma board		
Size: A4	Date: 27 dec 2010	Rev:
KiCad E.D.A.	eeschema (20100406 SVN-R2508)-final	Id: 13/56

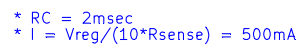


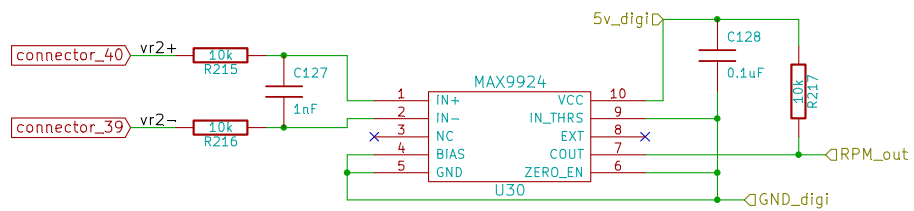


Self powered mode

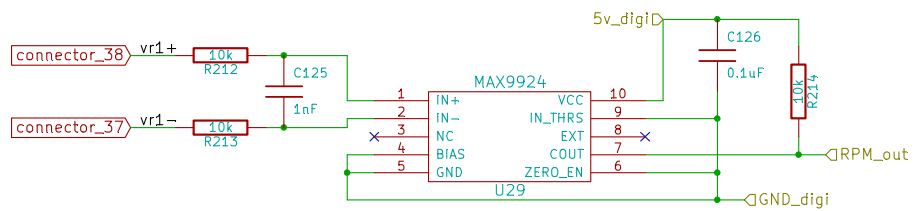
This device only support 85Â°C. To withstand 125Â°C it must be powered off.

diyefi.org		
File: ft232.sch		
Sheet: /CPU/ft232/		
Title: Puma board		
Size: A4	Date: 27 dec 2010	Rev:
KiCad E.D.A.	eeschema (20100406 SVN-R2508)-final	Id: 15/56





diyefi.org		
File: RPM_input_MAX9924_2.sch		
Sheet: /RPM_input_2/		
Title: Puma board		
Size: A4	Date: 27 dec 2010	Rev:
KiCad E.D.A. eeschema (20100406 SVN-R2508)-final		Id: 17/56



diyefi.org		
File: RPM_input_MAX9924_1.sch		
Sheet: /RPM_input_1/		
Title: Puma board		
Size: A4	Date: 27 dec 2010	Rev:
KiCad E.D.A. eeschema (20100406 SVN-R2508)-final		Id: 18/56

PEAK & HOLD INJECTOR DRIVER

inductive_power_driveD

1k R209

injector_outputD INJECTOR OUTPUT

12v_batD 3k R259

D112 LED 33V 15W

Q17 2N6044

inductive_power_gndD

5v_regD

U28 LM1949

1 IN 2 OUT 3 COMP 4 SENSE_IN 5 SENSE_GND 6 SUPPLY_GND 7 SUPPLY 8 TIMER

C122 .01uF

0.1 2W R210

3.9k R211

C123 1uF

TIMER CIRCUIT. 1 TAU IS THE MAX PEAK TIME.
 $3.9k \times 1uF = 3.9msec$

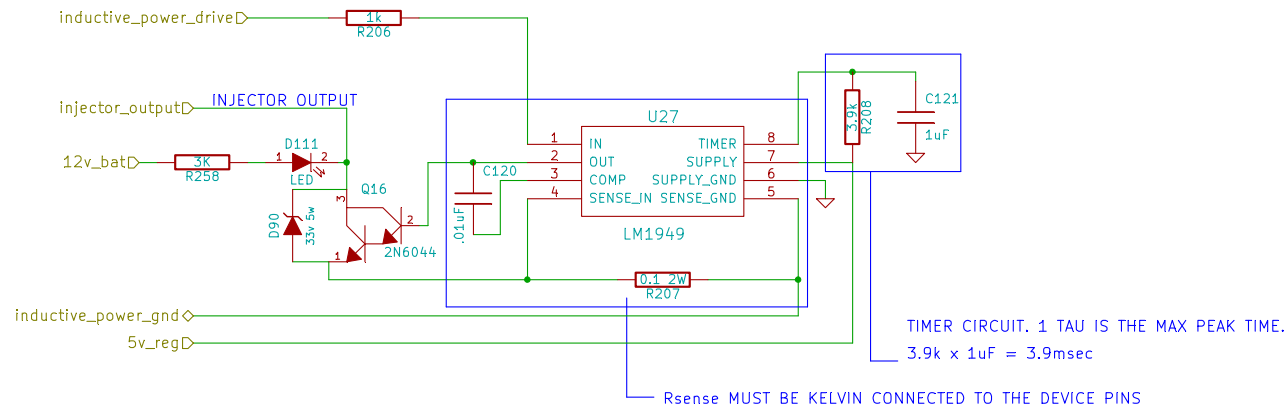
Rsense MUST BE KELVIN CONNECTED TO THE DEVICE PINS

injector_drive.sch		
diyefi.org		
File: injector_drive.sch		
Sheet: /injector_drive_8/		
Title: Puma board		
Size: A4	Date: 27 dec 2010	Rev: A.07
KiCad E.D.A. eeschema (20100406 SVN-R2508)-final		Id: 19/56

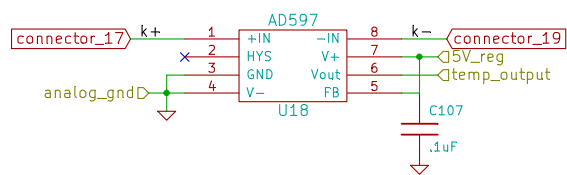
• R_{sense} MUST BE KELVIN CONNECTED TO THE DEVICE PINS

injector_drive.sch		
diyefi.org		
File: injector_drive.sch		
Sheet: /injector_drive_8/		
Title: Puma board		
Size: A4	Date: 27 dec 2010	Rev: A.07
KiCad E.D.A.	eeschema (20100406 SVN-R2508)-final	Id: 19/56

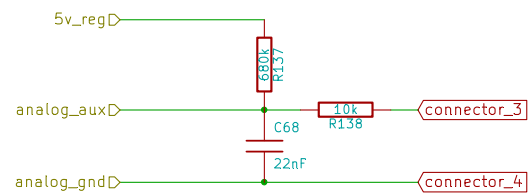
PEAK & HOLD INJECTOR DRIVER



injector_drive.sch		
diyefi.org		
File: injector_drive.sch		
Sheet: /injector_drive_7/		
Title: Puma board		
Size: A4	Date: 27 dec 2010	Rev: A.07
KiCad E.D.A.	eeschema (20100406 SVN-R2508)-final	Id: 20/56

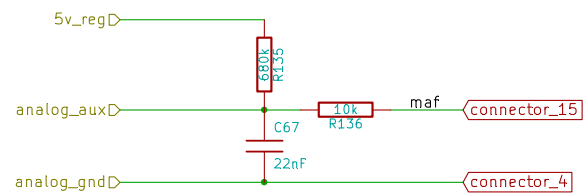


diyefi.org		
File: thermocuple_amplifier.sch		
Sheet: /thermocouple_amplifier/		
Title: Puma board		
Size: A4	Date: 27 dec 2010	Rev:
KiCad E.D.A.	eeschema (20100406 SVN-R2508)-final	Id: 21/56



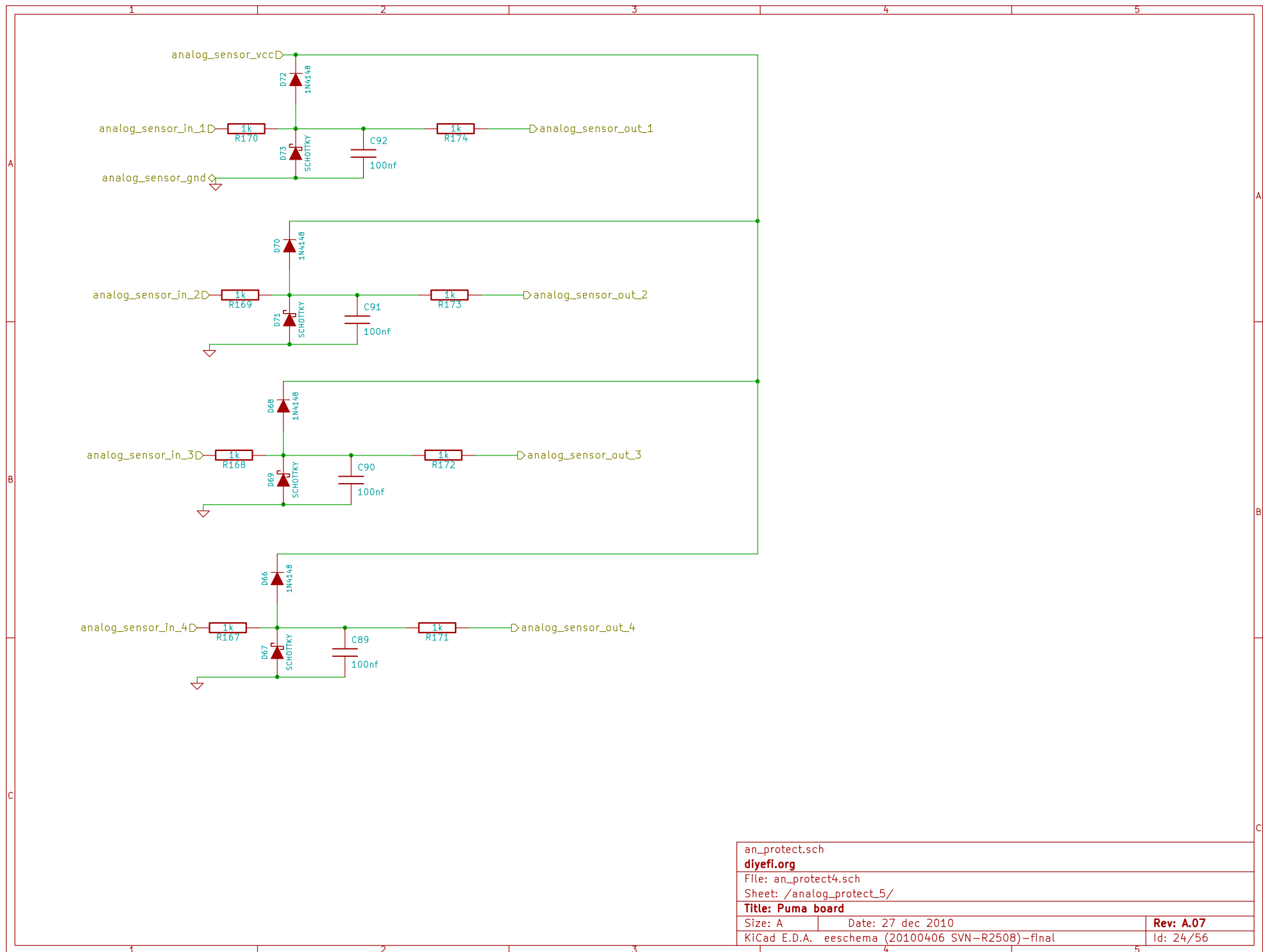
Filter settling time: 1ms ($4 \cdot RC = 0.88\text{ms}$)
Pull-up resistor for diagnosis

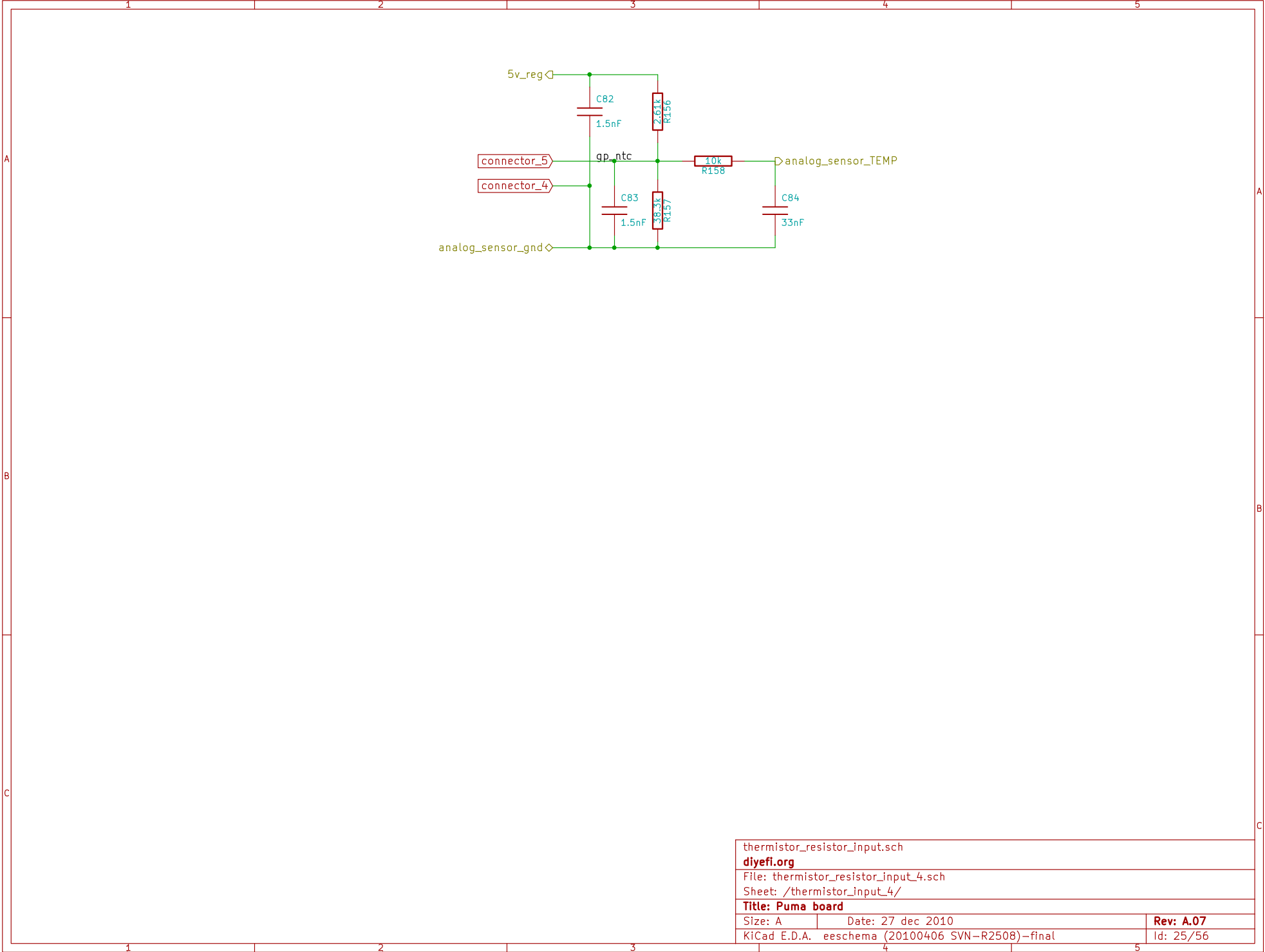
diyefi.org		
File: analog_aux_input.sch		
Sheet: /analog_input_1/		
Title: Puma board		
Size: A4	Date: 27 dec 2010	Rev:
KiCad E.D.A.	eeschema (20100406 SVN-R2508)-final	Id: 22/56



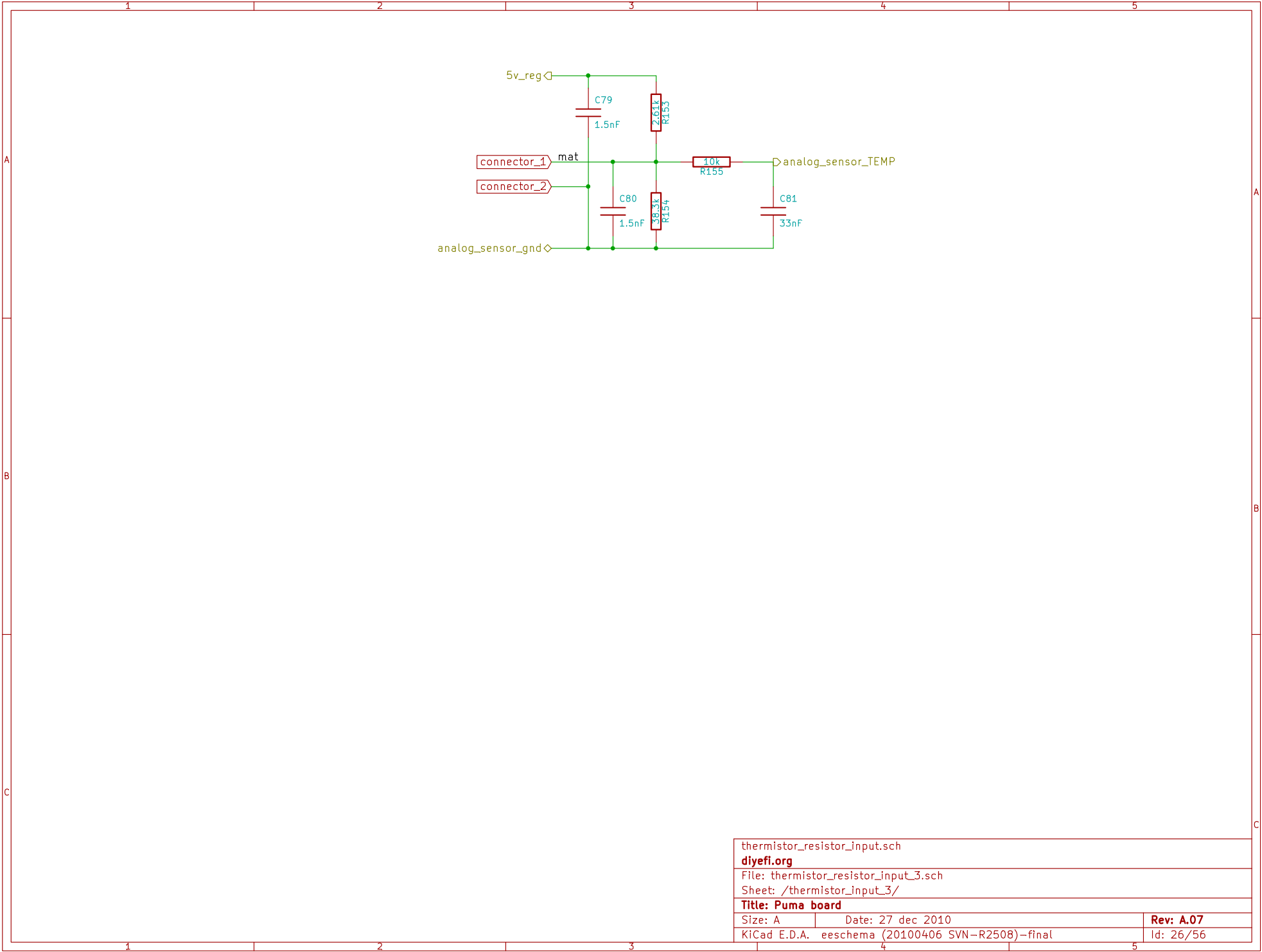
Filter settling time: 1ms ($4 \cdot RC = 0.88\text{ms}$)
 Pull-up resistor for diagnosis

diyefi.org		
File: MAF_input.sch		
Sheet: /MAF_input/		
Title: Puma board		
Size: A4	Date: 27 dec 2010	Rev:
KiCad E.D.A. eeschema (20100406 SVN-R2508)-final		Id: 23/56



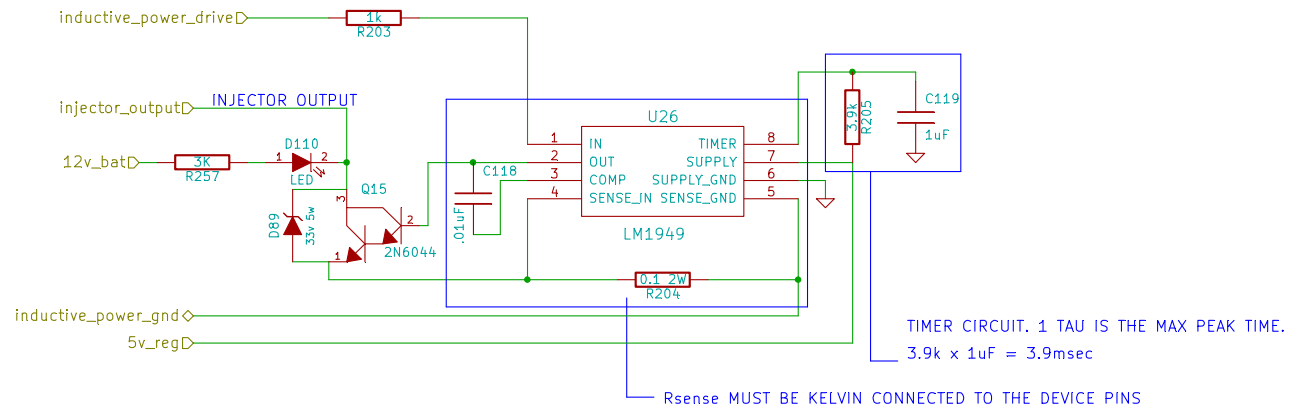


thermistor_resistor_input.sch		
diyefi.org		
File: thermistor_resistor_input_4.sch		
Sheet: /thermistor_input_4/		
Title: Puma board		
Size: A	Date: 27 dec 2010	Rev: A.07
KiCad E.D.A. eeschema (20100406 SVN-R2508)-final		Id: 25/56



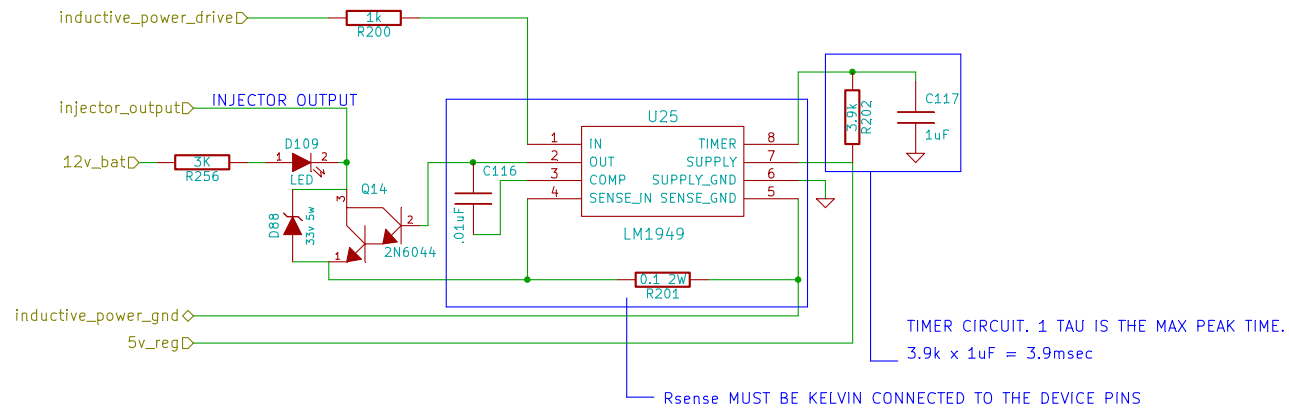
thermistor_resistor_input.sch		
diyefi.org		
File: thermistor_resistor_input_3.sch		
Sheet: /thermistor_input_3/		
Title: Puma board		
Size: A	Date: 27 dec 2010	Rev: A.07
KiCad E.D.A. eeschema (20100406 SVN-R2508)-final		Id: 26/56

PEAK & HOLD INJECTOR DRIVER



injector_drive.sch		
diyefi.org		
File: injector_drive.sch		
Sheet: /injector_drive_1/		
Title: Puma board		
Size: A4	Date: 27 dec 2010	Rev: A.07
KiCad E.D.A.	eeschema (20100406 SVN-R2508)-final	Id: 27/56

PEAK & HOLD INJECTOR DRIVER



injector_drive.sch		
diyefi.org		
File: injector_drive.sch		
Sheet: /injector_drive_2/		
Title: Puma board		
Size: A4	Date: 27 dec 2010	Rev: A.07
KiCad E.D.A. eeschema (20100406 SVN-R2508)-final		Id: 28/56

PEAK & HOLD INJECTOR DRIVER

inductive_power_drive

1k R197

injector_output INJECTOR OUTPUT

12v_bat 3k R255

D108 LED 33V 15W

Q13 2N6044

inductive_power_gnd

5v_reg

0.01uF C114

U24 LM1949

1 2 3 4 5 6 7 8

IN OUT COMP SENSE_IN SENSE_GND

3.9k R199

1uF C115

0.1 2W R198

TIMER CIRCUIT. 1 TAU IS THE MAX PEAK TIME.
 $3.9k \times 1\mu F = 3.9msec$

Rsense MUST BE KELVIN CONNECTED TO THE DEVICE PINS

injector_drive.sch		
diyefi.org		
File: injector_drive.sch		
Sheet: /injector_drive_3/		
Title: Puma board		
Size: A4	Date: 27 dec 2010	Rev: A.07
KiCad E.D.A. eeschema (20100406 SVN-R2508)-final		Id: 29/56

- R_{sense} MUST BE KELVIN CONNECTED TO THE DEVICE PINS

injector_drive.sch		
diyefi.org		
File: injector_drive.sch		
Sheet: /injector_drive_3/		
Title: Puma board		
Size: A4	Date: 27 dec 2010	Rev: A.07
KiCad E.D.A.	eesschema (20100406 SVN-R2508)-final	Id: 29/56

[illegible]

- R_{sense} MUST BE KELVIN CONNECTED TO THE DEVICE PINS

injector_drive.sch		
diyefi.org		
File: injector_drive.sch		
Sheet: /injector_drive_4/		
Title: Puma board		
Size: A4	Date: 27 dec 2010	Rev: A.07
KiCad E.D.A.	eeschema (20100406 SVN-R2508)–final	Id: 30/56

PEAK & HOLD INJECTOR DRIVER

inductive_power_drive

1k R191

injector_output INJECTOR OUTPUT

12v_bat 3k R253

D106 LED 33V 15W

Q11 2N6044

inductive_power_gnd

5v_reg

U22 LM1949

1 IN 2 OUT 3 COMP 4 SENSE_IN 5 SENSE_GND 6 SUPPLY_GND 7 SUPPLY 8

0.01uF C110

0.1 2W R192

3.9k R193

1uF C111

TIMER CIRCUIT. 1 TAU IS THE MAX PEAK TIME.
3.9k x 1uF = 3.9msec

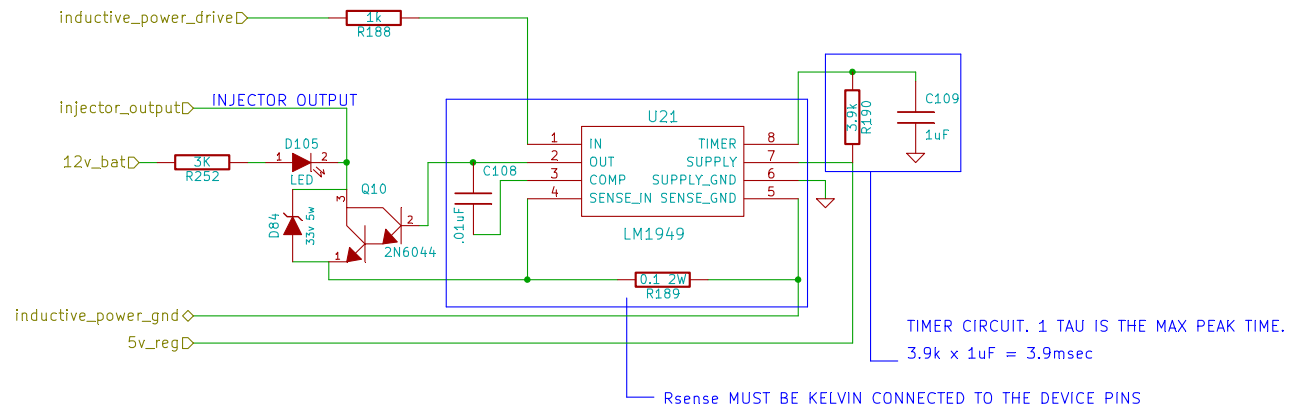
Rsense MUST BE KELVIN CONNECTED TO THE DEVICE PINS

injector_drive.sch		
diyefi.org		
File: injector_drive.sch		
Sheet: /injector_drive_5/		
Title: Puma board		
Size: A4	Date: 27 dec 2010	Rev: A.07
KiCad E.D.A. eeschema (20100406 SVN-R2508)-final		Id: 31/56

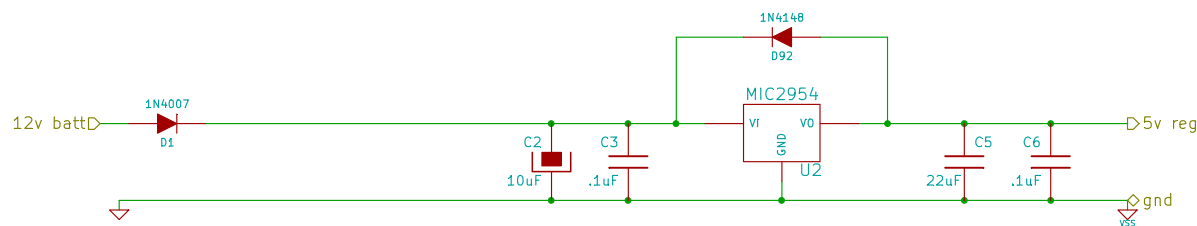
• R_{sense} MUST BE KELVIN CONNECTED TO THE DEVICE PINS

injector_drive.sch		
diyefi.org		
File: injector_drive.sch		
Sheet: /injector_drive_5/		
Title: Puma board		
Size: A4	Date: 27 dec 2010	Rev: A.07
KiCad E.D.A.	eeschema (20100406 SVN-R2508)-final	Id: 31/56

PEAK & HOLD INJECTOR DRIVER



injector_drive.sch		
diyefi.org		
File: injector_drive.sch		
Sheet: /injector_drive_6/		
Title: Puma board		
Size: A4	Date: 27 dec 2010	Rev: A.07
KiCad E.D.A.	eeschema (20100406 SVN-R2508)-final	Id: 32/56



Starting from left and moving to the right we have in order :

- Power feed and ground from battery and/or block
- Reverse polarity hook up protection diode
- Current limiting resistor
- Zener over voltage clamping diode
- Charge storage electrolytic polarised 25V 1000uF capacitor (value may change, but 220 – 2200 is around what we want)
- High frequency tantalum 25V 10uF capacitor (35V units are expensive, as are 22uF)
- Ultra high frequency ceramic 0.1uF capacitor (larger units with similar frequency response would also be acceptable)
- 5V LDO (low drop out) voltage regulator
- Reverse voltage protection diode for the regulator in case of external capacitors discharging more quickly and/or to a lower level than internal ones (snubbing not required as this will not happen when things are actually running)
- High frequency tantalum 25V 10uF capacitor (35V units are expensive, as are 22uF)
- Ultra high frequency ceramic 0.1uF capacitor (larger units with similar frequency response would also be acceptable)
- Power feed and ground for CPU core

power_reg.sch

diyefi.org

File: power_reg2.sch

Sheet: /voltage regulator (cpu)/

Title: Puma board

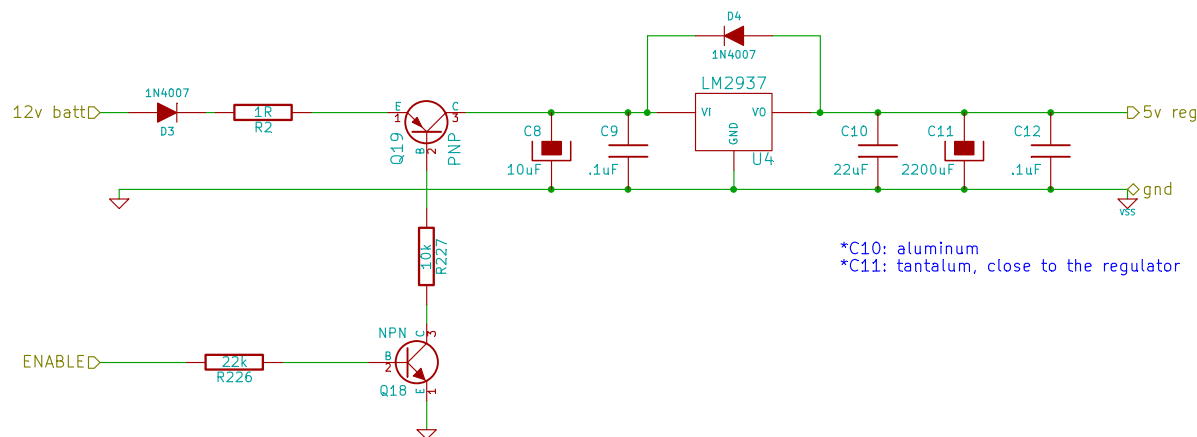
Size: A

Date: 27 dec 2010

Rev: A.07

KiCad E.D.A. eeschema (20100406 SVN-R2508)–final

Id: 33/56



Starting from left and moving to the right we have in order :

- Power feed and ground from battery and/or block
- Reverse polarity hook up protection diode
- Current limiting resistor
- Zener over voltage clamping diode
- Charge storage electrolytic polarised 25V 1000uF capacitor (value may change, but 220 – 2200 is around what we want)
- High frequency tantalum 25V 10uF capacitor (35V units are expensive, as are 22uF)
- Ultra high frequency ceramic 0.1uF capacitor (larger units with similar frequency response would also be acceptable)
- 5V LDO (low drop out) voltage regulator
- Reverse voltage protection diode for the regulator in case of external capacitors discharging more quickly and/or to a lower level than internal ones (snubbing not required as this will not happen when things are actually running)
- High frequency tantalum 25V 10uF capacitor (35V units are expensive, as are 22uF)
- Ultra high frequency ceramic 0.1uF capacitor (larger units with similar frequency response would also be acceptable)
- Power feed and ground for CPU core

power_reg.sch

diyefi.org

File: power_reg1.sch

Sheet: /voltage regulator (switched)/

Title: Puma board

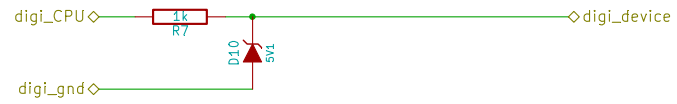
Size: A

Date: 27 dec 2010

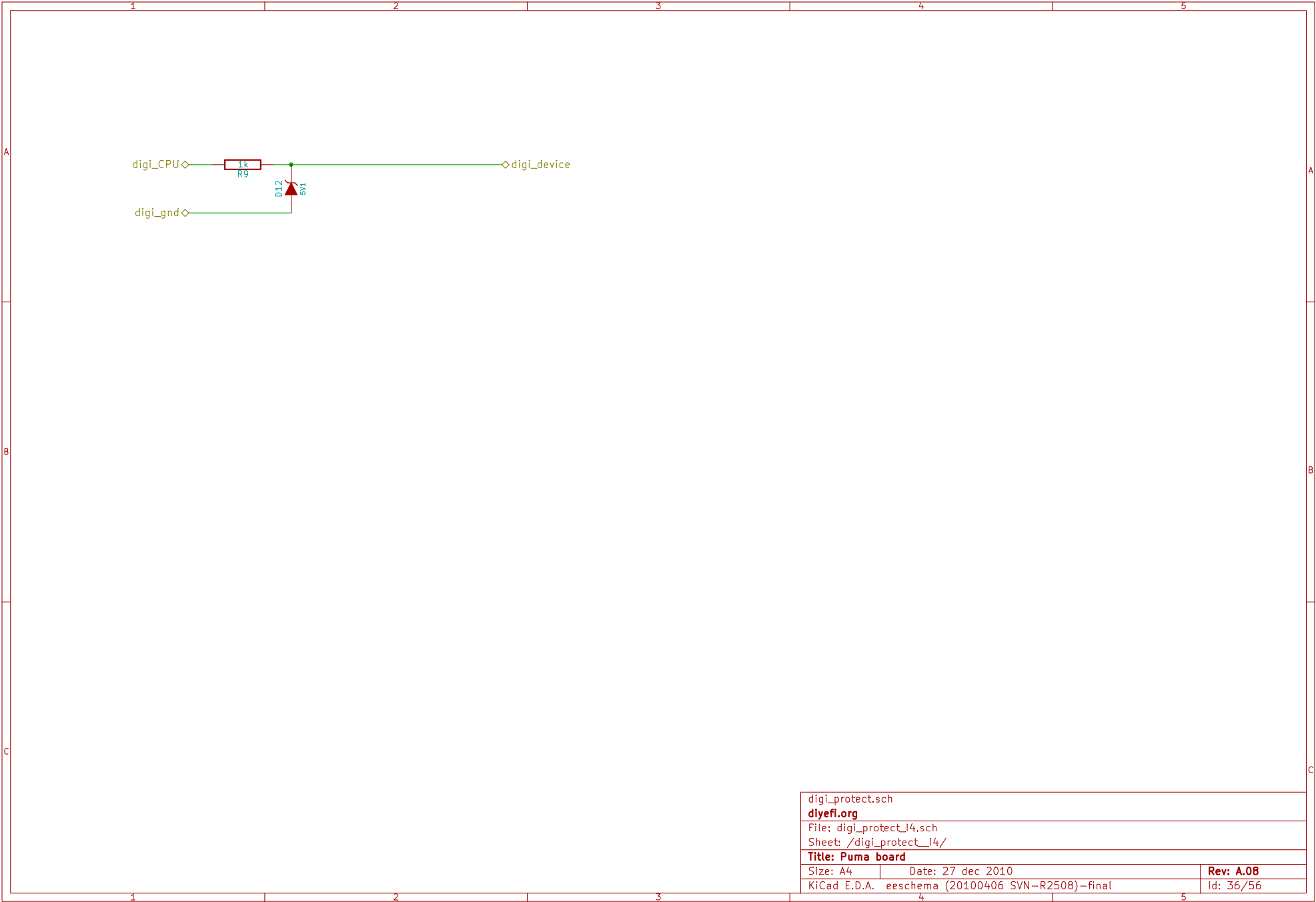
Rev: A.07

KiCad E.D.A. eeschema (20100406 SVN-R2508)–final

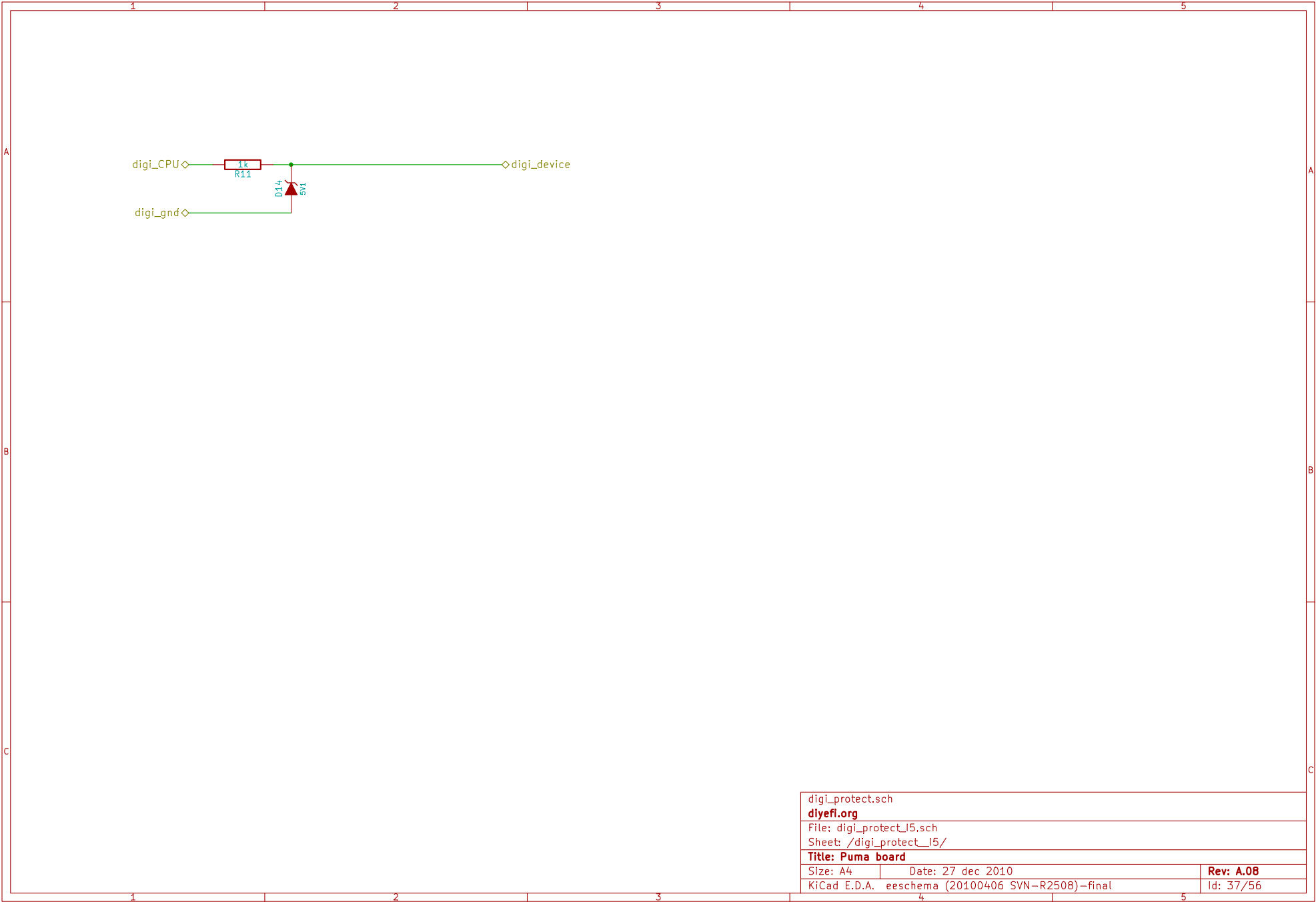
Id: 34/56

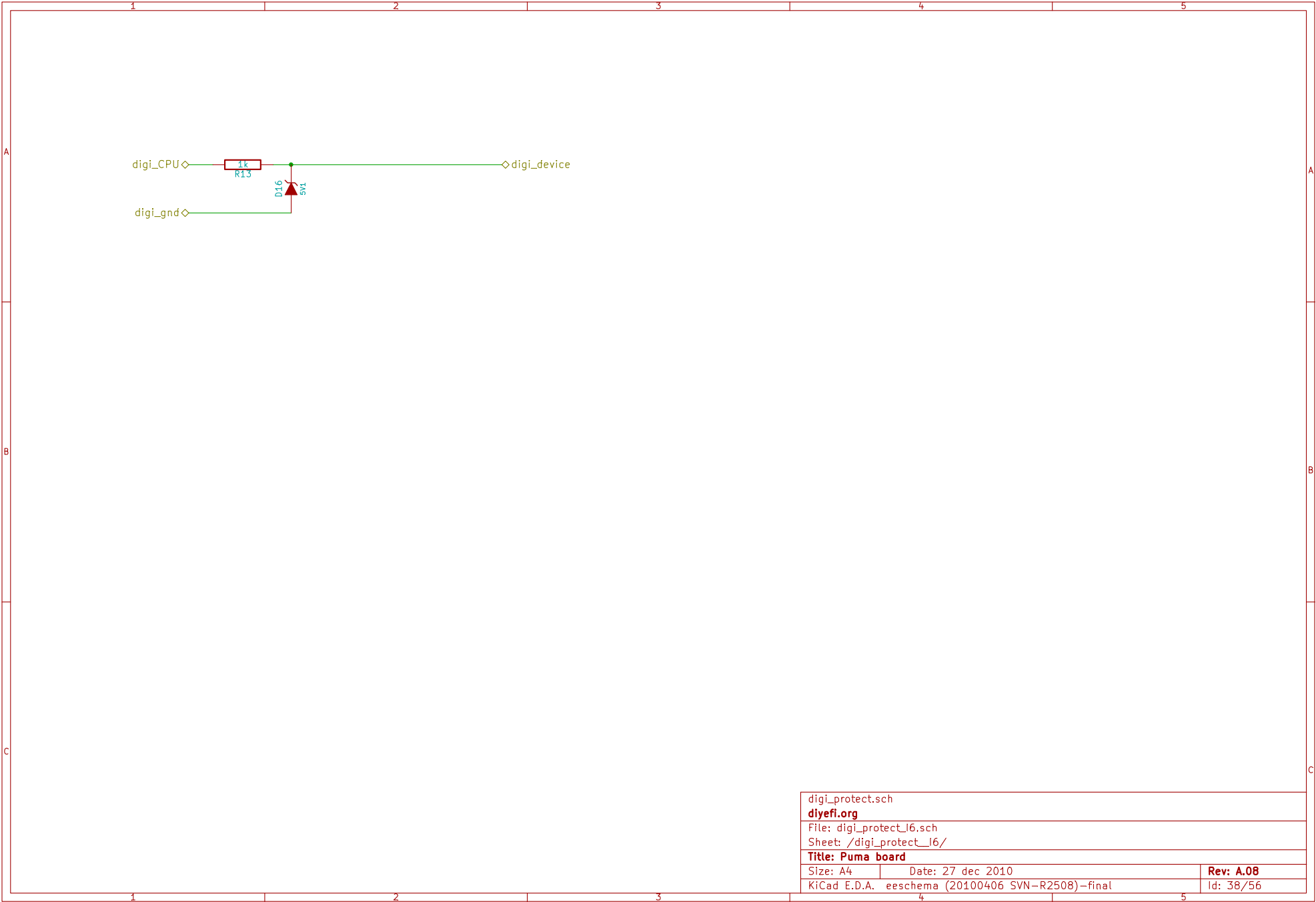


digi_protect.sch		
diyefi.org		
File: digi_protect_I3.sch		
Sheet: /digi_protect_I3/		
Title: Puma board		
Size: A4	Date: 27 dec 2010	Rev: A.08
KiCad E.D.A.	eeschema (20100406 SVN-R2508)-final	Id: 35/56

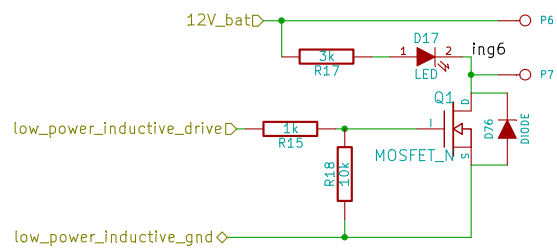


digi_protect.sch		
diyefi.org		
File: digi_protect_I4.sch		
Sheet: /digi_protect_I4/		
Title: Puma board		
Size: A4	Date: 27 dec 2010	Rev: A.08
KiCad E.D.A.	eeschema (20100406 SVN-R2508)-final	Id: 36/56

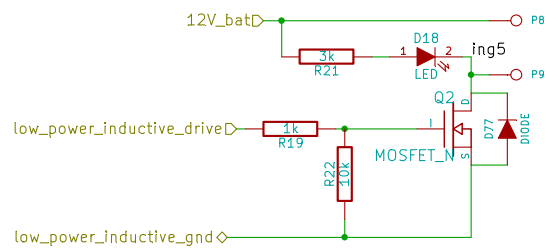




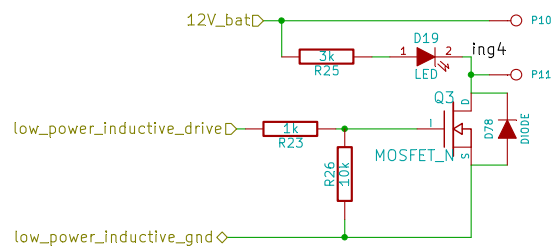
digi_protect.sch		
diyefi.org		
File: digi_protect_l6.sch		
Sheet: /digi_protect_l6/		
Title: Puma board		
Size: A4	Date: 27 dec 2010	Rev: A.08
KiCad E.D.A.	eeschema (20100406 SVN-R2508)-final	Id: 38/56



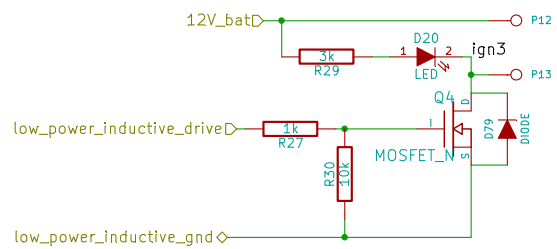
ignition.sch		
diyefi.org		
File: ignition6.sch		
Sheet: /igniter_6/		
Title: Puma board		
Size: A4	Date: 27 dec 2010	Rev: A.07
KiCad E.D.A. eeschema (20100406 SVN-R2508)-final		Id: 39/56



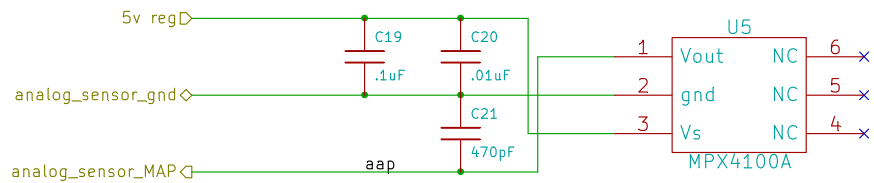
ignition.sch		
diyefi.org		
File: ignition5.sch		
Sheet: /igniter_5/		
Title: Puma board		
Size: A4	Date: 27 dec 2010	Rev: A.07
KiCad E.D.A. eeschema (20100406 SVN-R2508)-final		Id: 40/56



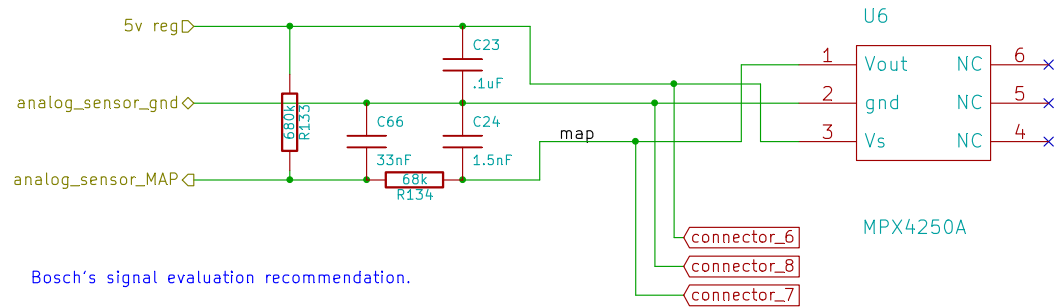
ignition.sch		
diyefi.org		
File: ignition4.sch		
Sheet: /igniter_4/		
Title: Puma board		
Size: A4	Date: 27 dec 2010	Rev: A.07
KiCad E.D.A. eeschema (20100406 SVN-R2508)-final		Id: 41/56



ignition.sch		
diyefi.org		
File: ignition3.sch		
Sheet: /igniter_3/		
Title: Puma board		
Size: A4	Date: 27 dec 2010	Rev: A.07
KiCad E.D.A. eeschema (20100406 SVN-R2508)-final		Id: 42/56



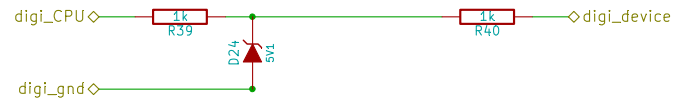
MAP_input.sch		
diyefi.org		
File: MAP_input_2.sch		
Sheet: /MAP_input_baro/		
Title: Puma board		
Size: A	Date: 27 dec 2010	Rev: A.07
KiCad E.D.A. eeschema (20100406 SVN-R2508)-final		Id: 43/56



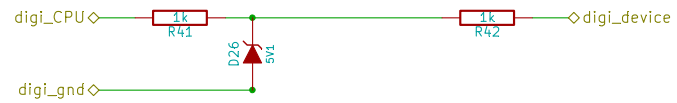
Bosch's signal evaluation recommendation.

The 680k pull up resistor is for diagnostics

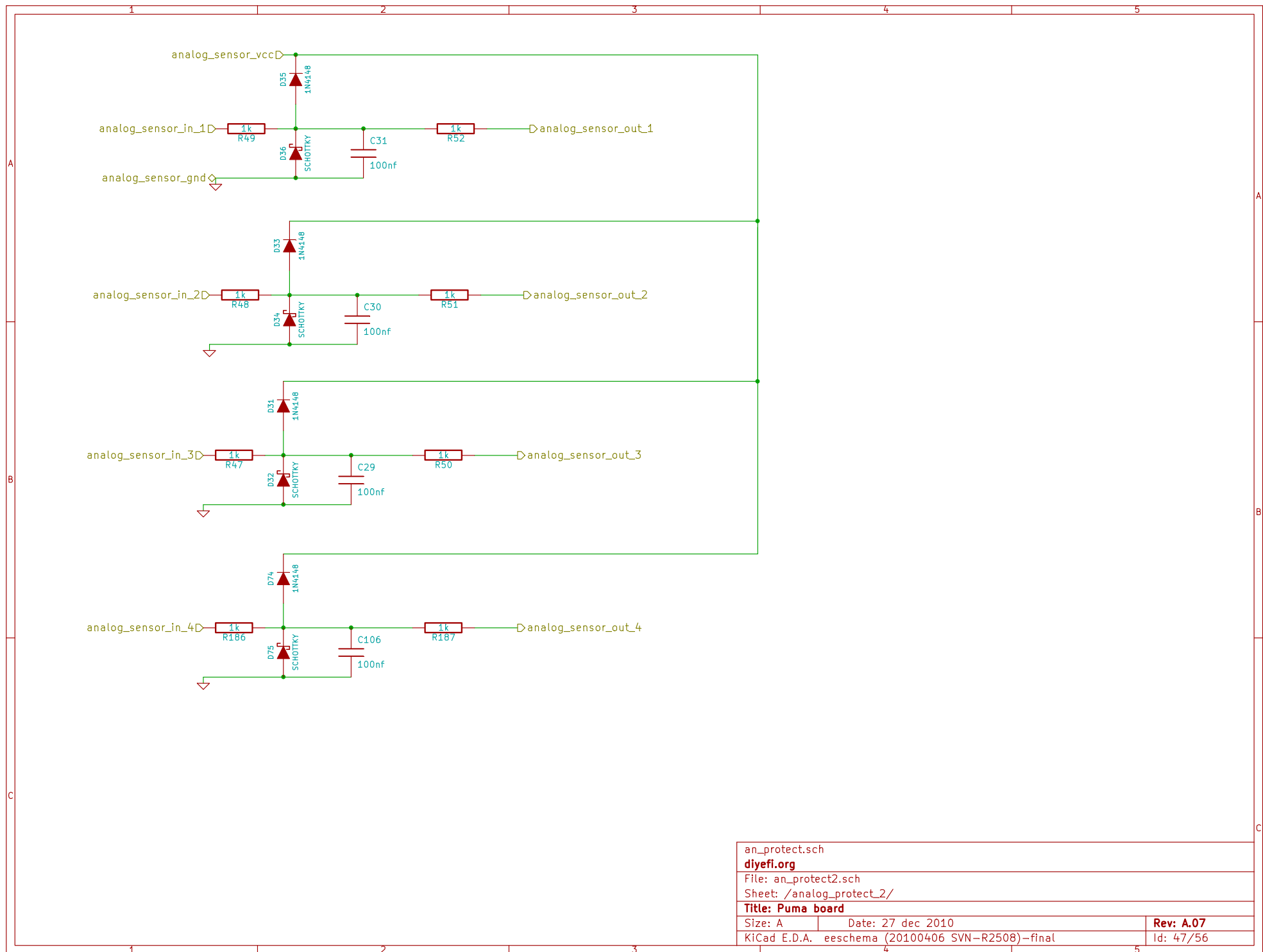
MAP_input.sch		
diyefi.org		
File: MAP_input_1.sch		
Sheet: /MAP_input/		
Title: Puma board		
Size: A	Date: 27 dec 2010	Rev: A.07
KiCad E.D.A. eeschema (20100406 SVN-R2508)-final		Id: 44/56

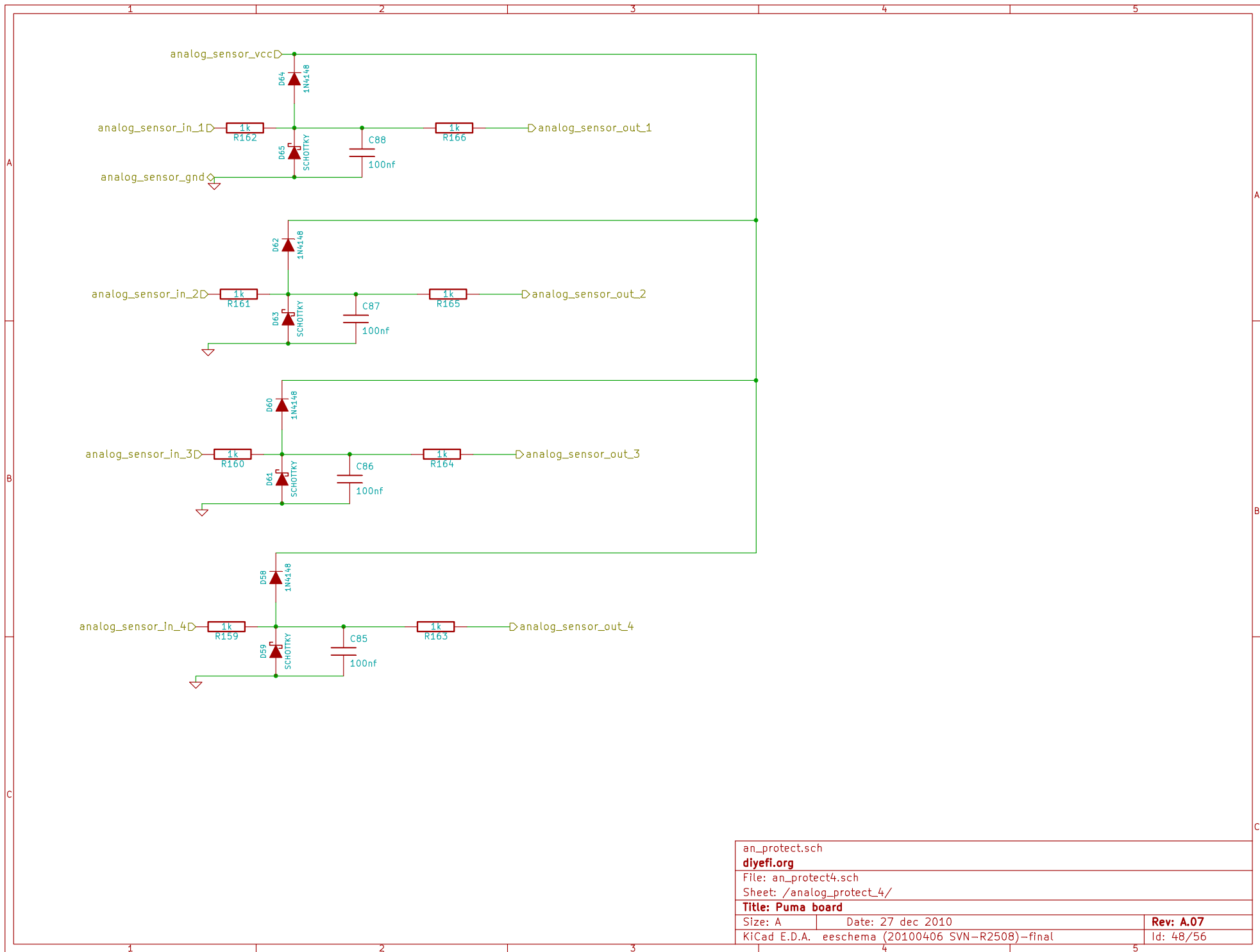


digi_protect.sch		
diyefi.org		
File: digi_protect_rpm1.sch		
Sheet: /digi_protect_rpm1/		
Title: Puma board		
Size: A4	Date: 27 dec 2010	Rev: A.08
KiCad E.D.A.	eeschema (20100406 SVN-R2508)-final	Id: 45/56



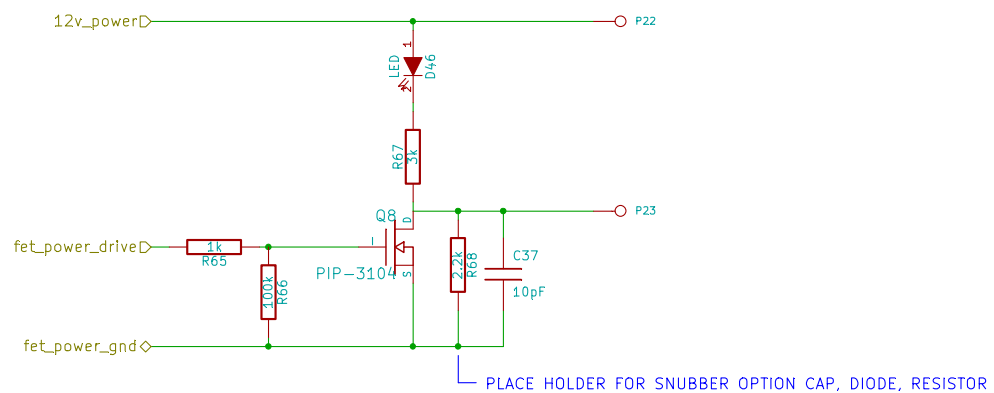
digi_protect.sch		
diyefi.org		
File: digi_protect_rpm2.sch		
Sheet: /digi_protect_rpm2/		
Title: Puma board		
Size: A4	Date: 27 dec 2010	Rev: A.08
KiCad E.D.A.	eeschema (20100406 SVN-R2508)-final	Id: 46/56



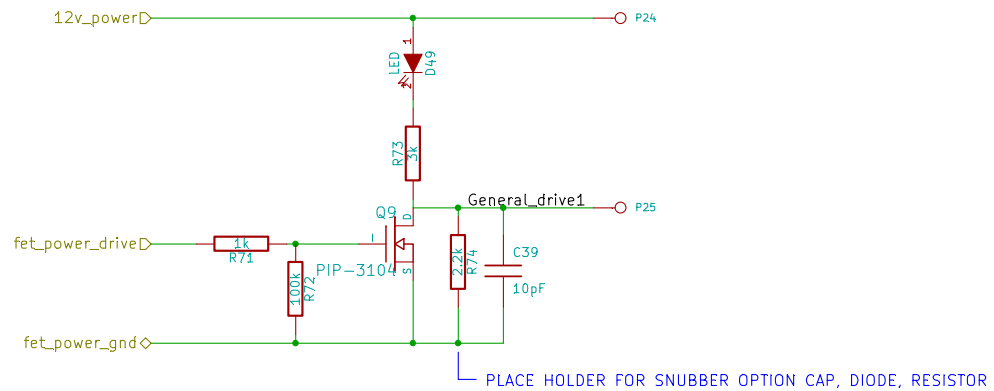




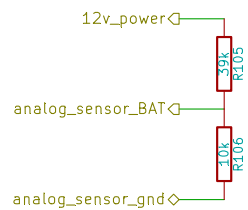
02_input.sch		
diyefi.org		
File: 02_input.sch		
Sheet: /02 INPUT/		
Title: Puma board		
Size: A4	Date: 27 dec 2010	Rev: A.08
KiCad E.D.A. eeschema (20100406 SVN-R2508)-final		Id: 49/56



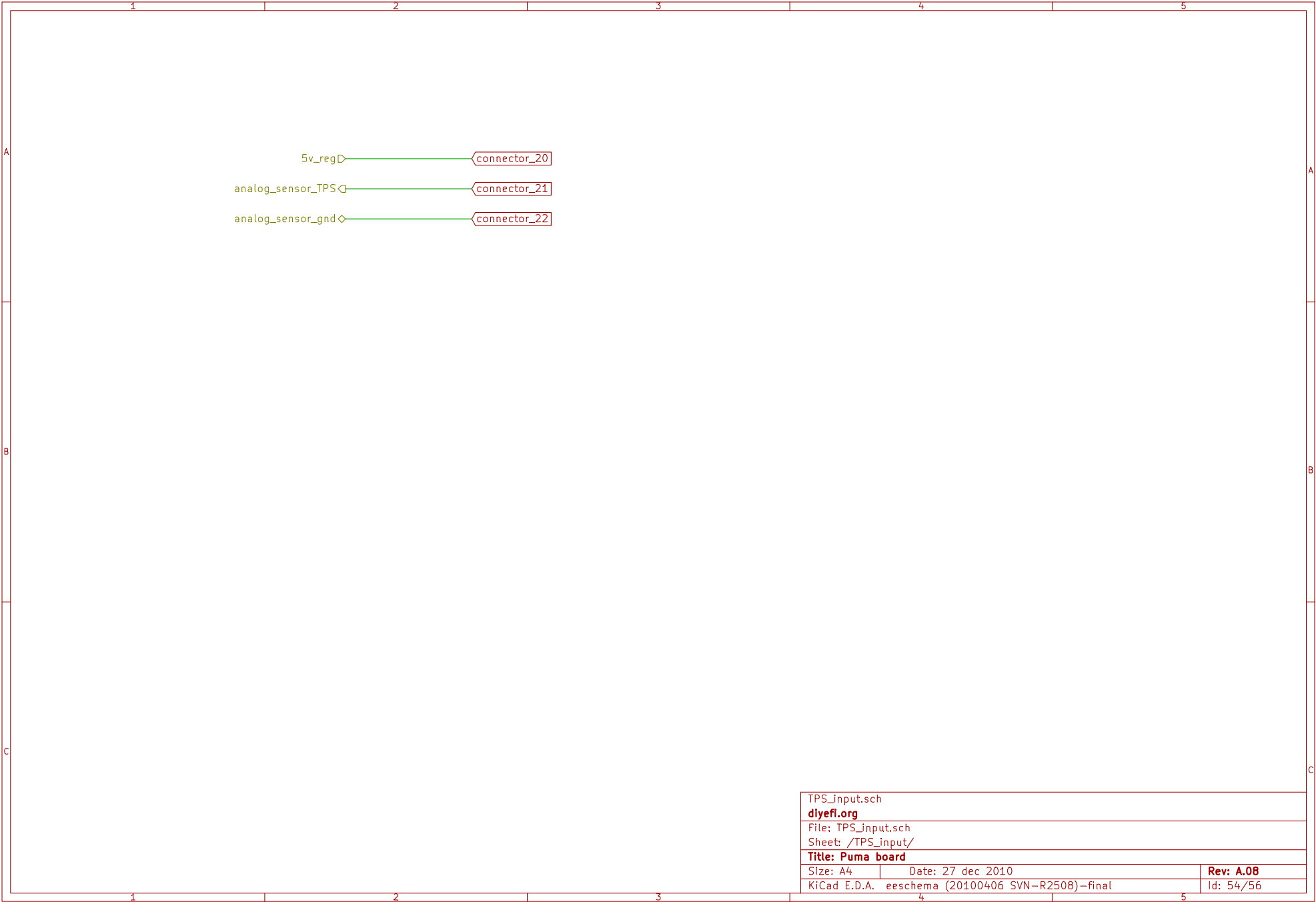
general_drive.sch		
diyefi.org		
File: general_drive1.sch		
Sheet: /misc ouput 2/		
Title: Puma board		
Size: A4	Date: 27 dec 2010	Rev: A.07
KiCad E.D.A. eeschema (20100406 SVN-R2508)-final		Id: 51/56

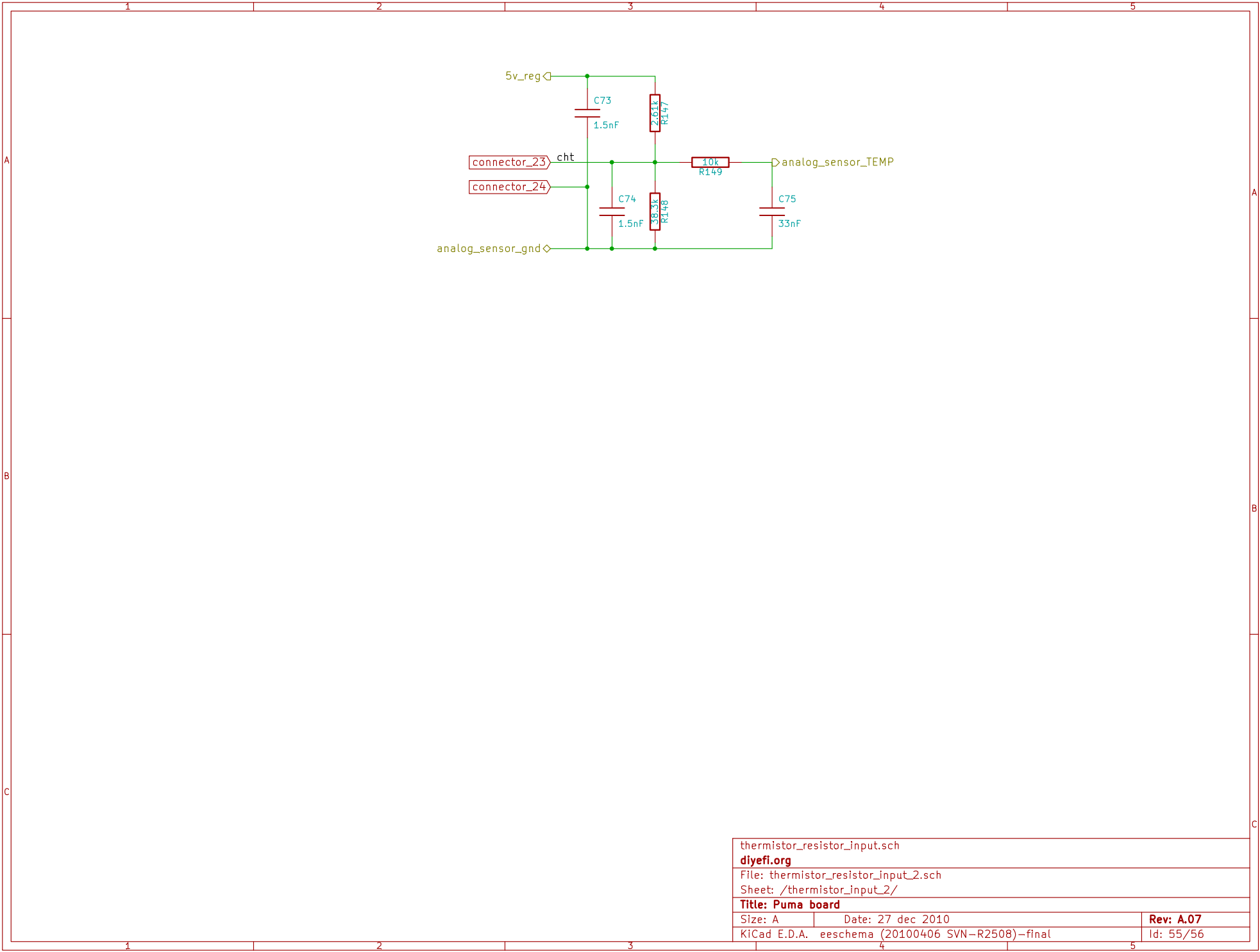


general_drive_fuel.sch		
diyefi.org		
File: general_drive_fuel.sch		
Sheet: /misc output 1/		
Title: Puma board		
Size: A4	Date: 27 dec 2010	Rev: A.07
KiCad E.D.A.	eeschema (20100406 SVN-R2508)-final	Id: 52/56

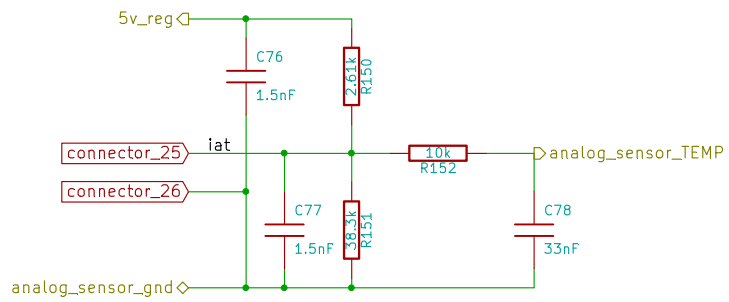


BAT_condition		
diyefi.org		
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Title: Puma board		
Size: A4	Date: 27 dec 2010	Rev: A.08
KiCad E.D.A.	eeschema (20100406 SVN-R2508)-final	Id: 53/56





thermistor_resistor_input.sch		
diyefi.org		
File: thermistor_resistor_input_2.sch		
Sheet: /thermistor_input_2/		
Title: Puma board		
Size: A	Date: 27 dec 2010	Rev: A.07
KiCad E.D.A. eeschema (20100406 SVN-R2508)-final		Id: 55/56



thermistor_resistor_input.sch

diyefi.org

File: thermistor_resistor_input_1.sch

Sheet: /thermistor_input_1/

Title: Puma board

Size: A Date: 27 dec 2010

KiCad E.D.A. eeschema (20100406 SVN-R2508)-final

Rev: A.07

Id: 56/56